STULZ

CLIMATE. CUSTOMIZED.







STULZ Shelter Cooling

Ideal cooling solutions for modular buildings, edge and telecommunications applications

The complete range of air conditioning technology – from one source.

For over 40 years, the STULZ family-run company has been synonymous with precision air conditioning at the highest level.

Our solutions for the air conditioning of business-critical applications and sensitive systems have made us a leading company in our industry.

Whether for data centers, industry or communication technology, the STULZ portfolio has a tailor-made cooling solution to suit your requirements.

We guarantee adherence to our uncompromisingly high requirements and quality standards both at our factory in Hamburg and all our production sites around the globe. Moreover, we work hard not only to satisfy our customers' individual wishes, but also to make sure our air conditioning solutions offer maximum energy efficiency and a minimal CO_2 footprint.

Our portfolio extends from traditional room cooling and High Density Cooling to chillers, air handling units and container modules, all the way to micro data centers, service, and our self-developed monitoring software. An all-embracing quality assurance system monitors all the details in development, production, implementation, and service.

Today, STULZ has a presence in more than 140 countries. STULZ GmbH has 21 subsidiaries and ten production sites in Europe, India, China, and North and South America. We also have partner agreements with numerous sales and service partners on every continent. Our network of highly qualified specialists is a reliable guarantee of the highest standards.

The combined wealth of our experience, values, performance and service is what defines us and is especially valued by our customers. Air conditioning solutions – custom tailored and from one source:
ONE STULZ. ONE SOURCE.



STULZ Shelter Cooling – for autonomous use and maximum potential savings

Sturdy precision air conditioning units with integrated Free Cooling for self-sufficient use in modular buildings, containers and air conditioning receiver and transmitter base stations

STULZ supplies four different systems, custom tailored to your individual requirements, which come with the option of Free Cooling, saving on the cost of energy for your air conditioning.

Compact, sturdy and economical to run, these systems ensure reliable cooling around the clock for many years. The units are plug & play and therefore immediately ready for connection and use. They enable very long maintenance intervals and remote monitoring.

Thanks to the vast range of options available, they can be configured precisely to customers' specific needs and requirements.

+ All advantages at a glance

- Reliable and efficient operation all year round
- Energy consumption reduced by over 90 % thanks to Free Cooling
- Fast and simple start-up
- Low CO_2 output
- Long maintenance intervals
- Customized adaptations and special solutions for every application
- Connectivity: Monitoring and remote access available for all units via a web interface
- Backup operation (Free Cooling and backup cooling) on failure of the main power supply
- Automatic restart after power failure
- Worldwide service



The right solution for your application – wherever you need us

Whether your business-critical system is working in temperatures of up to 55 °C, in ambient air contaminated by particles, in temperatures as low as -40 °C, or in a permanently humid environment – you can always rely on systems from STULZ.

The advantages of plug & play

- All products in the Shelter Cooling series are factory tested, filled with refrigerant and ready for connection and operation right from the start
- Reduced installation time and costs
- Speedier start-up

	STULZ Shelter Cooling		DX mode	Mixed mode	Free Cooling	48 V DC backup operation	Max. kW
Indoor installation	**TelAir**		•	•	•	•	16
	ShelterAir FC FCL-IN				•	•	15
Outdoor installation	**WallAir**		•	•	•	•	16
	SplitAir		•	•	•	•	16
	ShelterAir FC FCL				•	•	6

Free Cooling – always have the advantage

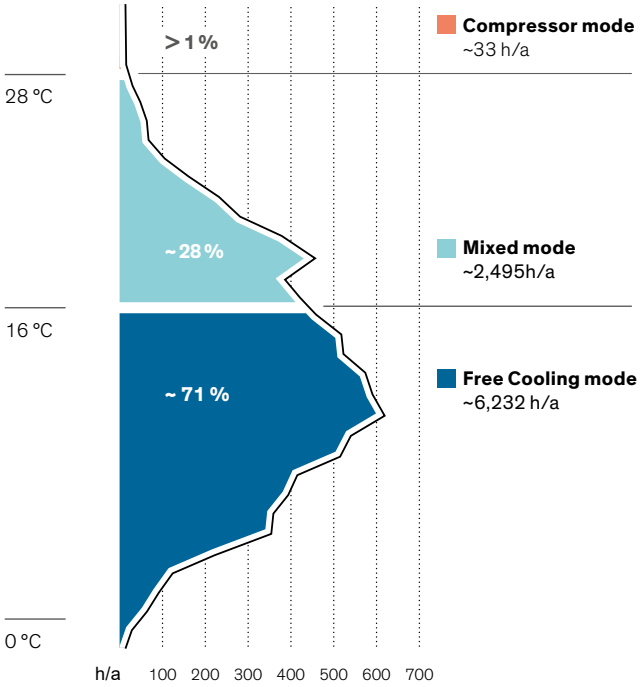
In many base stations and small data centers, comfort air conditioning units without Free Cooling mode are still used today for air conditioning, with high energy consumption as the result. Units from STULZ's Shelter Cooling series exploit the potential of Free Cooling, dramatically lowering your energy costs.

Free Cooling
At low outside temperatures, outside air is used directly for cooling. The outside air is conveyed into the interior when the air damper is open. Energy-intensive compressor cooling is not needed when outside temperatures are low. This way, Free Cooling brings you huge potential savings.

Mixed mode
If Free Cooling is not sufficiently available due to the outside temperature, the unit can still use the outside air to some extent. The result is a combination of compressor cooling and Free Cooling.

Compressor mode (DX)
If outside temperatures are so high that the outside air would no longer help to cool the inside, all cooling is generated using the compressor. Even in this mode, the perfectly harmonized components we use keep STULZ air conditioning units working reliably and efficiently.

Savings with Free Cooling



TelAir	With Free Cooling	Without Free Cooling
Energy consumption	**7,420 kWh**	**46,282 kWh**
Energy costs	**€ 1,113.07**	**€ 6,942.41**
Savings per year	**€ 5,829.34**	

Efficient air conduction and intelligent control of operating modes enable savings up to 90 % to be achieved.

Energy consumption using the example of a TelAir TXGA6 unit at a return air temperature of 30 °C, based on the temperature profile of the city of London, 0.15 €/kWh

Optimum operational reliability for your application

Backup operation for maximum reliability

In telecommunications, in particular, high reliability is vital to prevent any loss of network availability. Thanks to the additional 48 V DC power source, backup operation with Free Cooling is available. If the main power supply fails, the Shelter Cooling units continue providing backup cooling to keep your system running reliably.

Connectivity for maximum availability

Monitoring and remote diagnosis are available for all units via a web interface. This enables rapid intervention and therefore immediate troubleshooting in all situations. What's more, our units support numerous communication protocols for integration in building services management systems.

- Data recording
- Remote configuration
- Firmware updates
- Alarm relaying

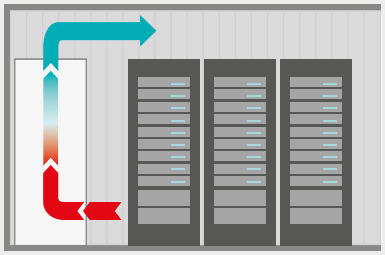
Air conduction with maximum flexibility

With different air conduction options, these units offer greater flexibility for individual customer solutions. With or without raised floor, with or without displacement, STULZ designs precisely the right solution for your particular case.

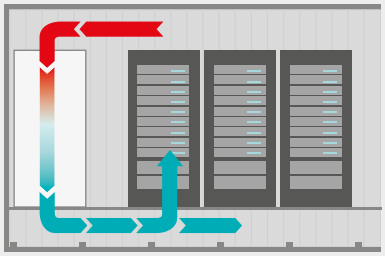
Upflow units draw the return air out of the room via the lower front of the air conditioning unit, and expel the cooled supply air upward.

Downflow units draw the return air out of the room from above and expel the cooled supply air down into the raised floor. Through the raised floor, the supply air gets to precisely those spots in the room that need cooling, preventing hot and cold air from mixing and increasing efficiency.

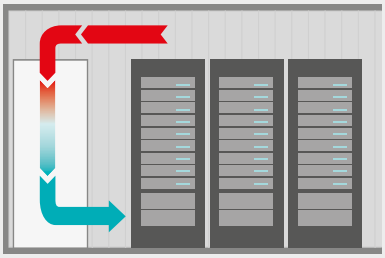
Displacement units enable cold supply air to flow close to the floor at low speed. The resulting "pool" of cold air on the floor prevents hot and cold air from mixing. This principle increases the number of operating hours with Free Cooling, achieving maximum potential savings.



Upflow



Downflow



Displacement

Climate. Customized. You have the challenge, we have the solution.

From standard units to fully customized solutions – the ability to offer such a wide range to customers is the embodiment of our philosophy, "**Climate**. **Customized.**".

#1 Climate. Customized.
Standard units
For its standard units, STULZ offers a huge selection of accessories and options to permit a high level of flexibility and customization.



#2 Climate. Customized.
Standard units with special options
Above and beyond the standard units, STULZ designers realize customer-specific options to individualize standard units to an enormous extent.

#3 Climate. Customized.
Customized air conditioning solutions
STULZ has the solution! In collaboration with customers and tailored to their requirements, we plan, implement and provide continuous support for the perfect air conditioning solution. This way, we can develop individual air conditioning solutions with performance features that all match one another perfectly from the outset.

EC technology for maximum savings

Units from the STULZ Shelter Cooling series are available with fan speed control and optional variable-speed EC compressor.

The EC compressor we use is especially energy efficient in partial load mode, and guarantees a constant supply air temperature. The integrated compressor soft start and infinite control without compressor on/off cycles ensure a long service life in continuous operation.



STULZ control systems

To be able to cool IT systems efficiently and reliably, air conditioning units and their control systems must work in perfect harmony. That is why here at STULZ, we design both – air conditioning units and controllers – under one roof. And on this basis, we can guarantee maximum reliability and efficiency for STULZ hardware and software – to your lasting advantage.

SEC.blue/C2020 microprocessor for WallAir, TelAir and SplitAir

The SEC.blue/C2020 consists of a controller and optional operator terminal. The controller manages all functions of STULZ Shelter Cooling products. The operator terminal, consisting of a keypad and LCD, displays the most important operating states and alerts.

Sequencing
- Up to ten units can be configured in one air conditioning system. If an individual unit drops out or the heat load rises, the standby unit is activated for additional support.
- The operating times of all connected air conditioning units are compared to make sure each one is used to an equal extent.

Night mode
- Time-controlled limitation of the condenser and evaporator fan speed for quiet operation

Energy-saving mode
- The (adjustable) fan speed is automatically reduced at times when neither heating nor cooling is required

Multi-step configuration menu via operator terminal (password-protected)
- Plant operator
- Service

Multilingual display
- The operator terminal offers a choice of seven languages for displaying general menus, alarms and setpoints.

Monitoring and alarm relaying
- Via BMS systems (ModBus onboard, further protocols via WIB 1000/Ethernet)
- Via dry contacts (nine contacts are available): A high or low priority can be assigned to alarms.
- Via GSM modem (CompTrol SMS)

Controlling the various operating modes
- Free Cooling function dependent on temperature and enthalpy
- Mixed mode management
- Compressor mode
- Backup ventilation on failure of the main power supply
- Heating
- Humidification and dehumidification

Simple configuration and software updates
- Central configuration of units from a laptop
- Hardware key/USB stick for uploading and downloading software without a laptop and/or for copying the configuration to other units

High-pressure alarm management
- In order to avoid unnecessary service callouts, high-pressure alarms are initially reset three times automatically. If a further alarm occurs within four hours, this needs to be reset manually.

C102 microprocessor for ShelterAir FC

ShelterAir FC units are monitored and controlled by the C102 microprocessor control. Comfort air conditioning units can be integrated in the existing air conditioning system and also actuated by the C102 control. Whenever the outside temperature allows, Free Cooling mode is activated and the comfort air conditioning units are switched off.

The C102 microprocessor guarantees maximum versatility

- The integrated relays allow the C102 to control and monitor up to two connected comfort air conditioning units.
- Alternatively, it can control one air conditioning unit and one external heater.
- It directly measures the energy consumption of the ShelterAir FC units and records the operating hours of the comfort air conditioning units.
- It provides backup ventilation on failure of the main power supply or a fault in the comfort air conditioning units.
- It monitors DC voltage and disables the unit if the battery voltage is below an admissible threshold.
- A configurable filter alarm is triggered by differential pressure, or via an adjustable fan operating time.
- Service mode: Forced shutdown of a unit is possible, to enable service work to be performed at the base station. The air conditioning unit starts automatically after an adjustable time interval.
- Semi-automated start-up test to check all components
- Monitoring: ModBus onboard, further protocols such as HTTP and SNMP via WIB 1000



SEC.blue/C2020/C102 microprocessor

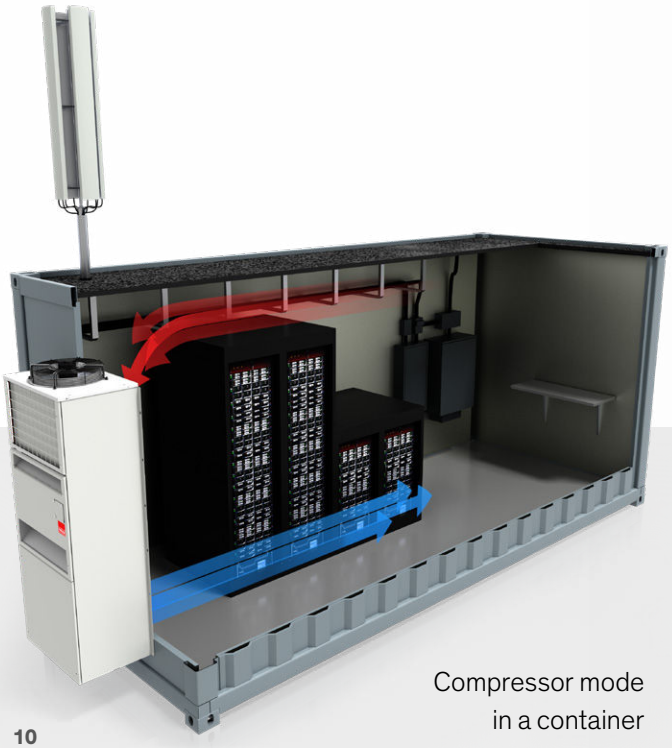
WallAir
for outdoor installation

In telecommunication containers, space is at a premium. WallAir units are installed outside the container, enabling the interior space to be exploited to the full. These compact, weather-resistant air conditioning units function using the displacement principle and are immediately ready for connection and use. As well as compressor mode, these units feature Free Cooling and Mixed modes, bringing you high savings on energy costs – entirely automatically.

Up to 84 % savings on energy costs thanks to Mixed and Free Cooling modes

Installing the WallAir

As the unit is installed outside the container, the entire interior space can be used for IT equipment.



Compressor mode
in a container



Free Cooling mode

AT A GLANCE

- ✔ Free Cooling
- ✔ Mixed mode
- ✔ Displacement
- ✖ Upflow
- ✖ Downflow
- ✔ Outdoor installation

Plug & play



ADVANTAGES

- Lower energy costs thanks to:
  - Free Cooling and Mixed modes
  - Displacement principle
  - Condensation pressure control
- Remote monitoring
- Outside air conditions -20/+50 °C winter/summer
- Low refrigerant quantity (less than 10 tons CO_2 equivalent)
- No annual leak test required in accordance with F-gas Regulation due to low refrigerant quantity and hermetically sealed refrigerant circuit (standard for EC compressor, optional for On/Off compressor)
- Refrigerant R407C for On/Off compressor
- Refrigerant R410A for EC compressor
- Filter monitor and airflow alarm
- Inside and outside temperature sensor
- Zigzag filter class ISO 16890: ePM_{10} 50 %
- Condenser with microchannel technology
- Control system SEC.blue

OPTIONS

- High-temperature operation up to 55 °C with R134a
- Winter kit up to -40 °C
- Compressor soft start for low start-up currents
- Electrical wiring, with connector for plug & play
- Backup operation with 48 V DC or 230 V/50 Hz/1 Ph
- External operator terminal
- Electric heater
- Humidity sensor

TelAir for indoor installation

TelAir units are designed for installation in telecommunications containers, equipment rooms and server rooms. The units are installed indoors for protection against environmental influences and vandalism. Thanks to their low noise levels, these air conditioning units can be used in residential areas without problem.

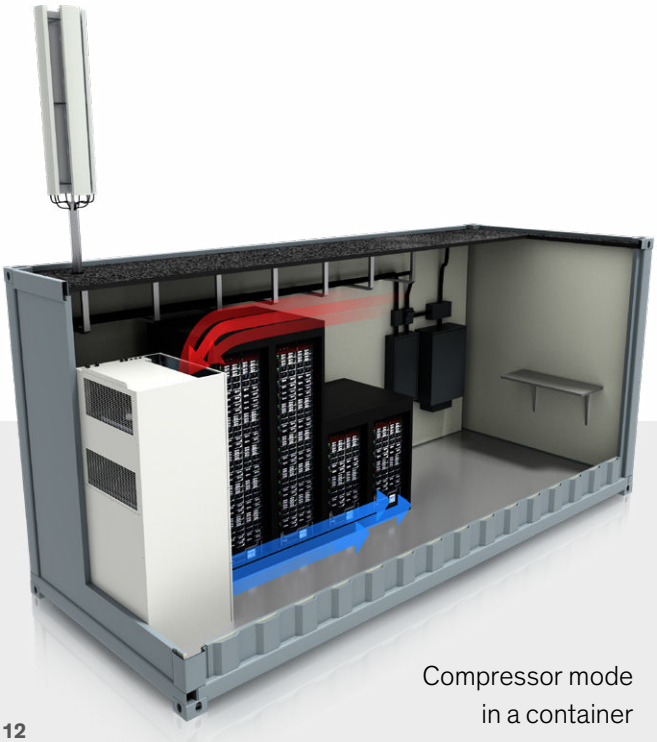
TelAir units are especially efficient in Free Cooling mode. With their high airflow in Free Cooling and Mixed modes, the units achieve maximum EER values.

The individual models of the TelAir series are available as Upflow, Downflow and Displacement versions. In the Displacement model, the airflow can be directed horizontally or vertically entirely individually as required via adjustable fins, to ensure optimum operation of your servers.

Up to 83 % savings on energy costs thanks to Mixed and Free Cooling modes

Installing the TelAir Displacement

As they are installed indoors, the units are protected from vandalism and the weather.



Compressor mode in a container



Free Cooling mode

AT A GLANCE

- Free Cooling
- Mixed mode
- Displacement
- Upflow
- Downflow
- Indoor installation

Plug & play



ADVANTAGES

- Lower energy costs thanks to:
  - Free Cooling and Mixed modes
  - Displacement principle
  - Condensation pressure control
- Remote monitoring
- Various air conduction options
- Outside air conditions -20/+50 °C winter/summer
- Low refrigerant quantity (less than 10 tons CO_2 equivalent)
- No annual leakage test required in accordance with F-gas regulation due to low refrigerant quantity and hermetically sealed refrigerant circuit (standard for EC compressor, optional for On/Off compressor)
- Refrigerant R407C
- Filter monitor and airflow alarm
- Inside and outside temperature sensor
- Zigzag filter class ISO 16890: ePM_{10} 50 %
- Condenser with microchannel technology
- SEC.blue control system

OPTIONS

- High temperature operation up to 55 °C with refrigerant R134a
- Winter kit up to -40 °C
- Compressor soft start for low start-up currents
- Electrical wiring, with connector for plug & play
- Backup operation with 48 V DC or 230 V/50 Hz/1 Ph
- External operator terminal
- Electric heater
- Humidity sensor
- Ethernet port

SplitAir for use when space is at a premium

The SplitAir is the energy and space-saving version for reliably cooling containers and modular buildings. The unit consists of an evaporator unit and condenser unit, and features Free Cooling and Mixed modes.

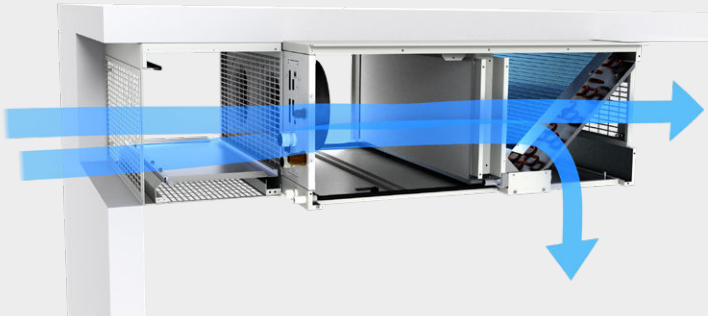
Because the indoor unit can be installed either on the ceiling or wall, the SplitAir is also ideal when space is at a premium. Thanks to the low noise level of the outdoor unit, the SplitAir can also be used without problem in residential areas.

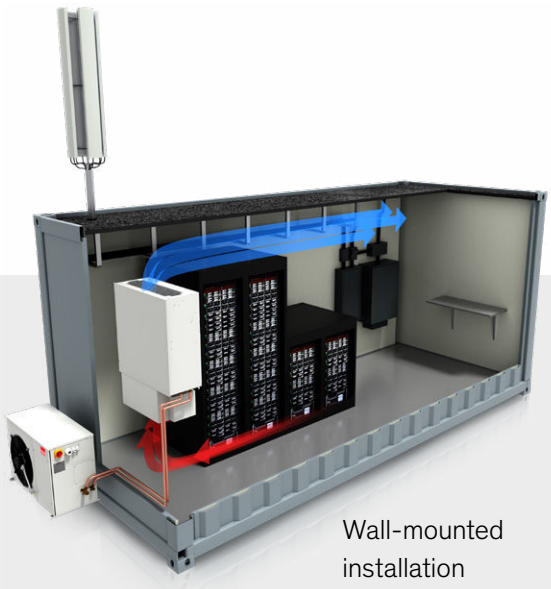
Up to 83 % savings on energy costs thanks to Mixed and Free Cooling modes

Installing the SplitAir

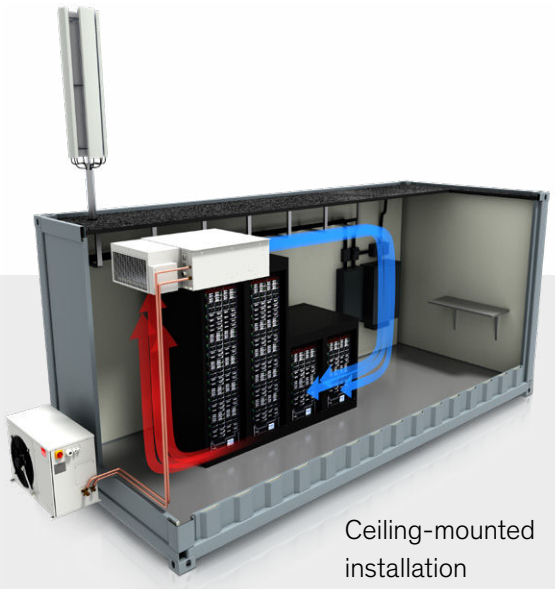
To save space for IT equipment, the SplitAir units are mounted on the wall or ceiling, as desired.

Free Cooling mode
Ceiling-mounted SplitAir





Wall-mounted installation



Ceiling-mounted installation

ADVANTAGES

- Lower energy costs thanks to:
  - Free Cooling and Mixed modes
  - Condensation pressure control
- High flexibility
  - Ceiling or wall-mounted installation
  - Variable air supply via the front or underside
  - Optionally with Free Cooling module
- Remote monitoring
- Quiet operation
- Refrigerant R407C
- Filter class ISO 16890 ePM_{10} 50 %
- Filter monitor
- C2020 microprocessor control
- Easy installation and maintenance
- Outside air conditions -25/+50 °C winter/summer

OPTIONS

- High-temperature operation up to 55 °C with R134a
- Winter kit up to -40 °C
- Compressor soft start
- Electric heater
- Heat exchangers coated for corrosion protection
- Installation kit for outdoor unit
- Air intake and blow-out grills
- Air duct for indoor unit
- WIB 1000 interface

AT A GLANCE

- ✔ Free Cooling
- ✔ Mixed mode
- ✖ Displacement
- ✖ Upflow
- ✖ Downflow

Plug & play

Indoor unit: Evaporator unit
with Free Cooling module



Outdoor unit: Compressor-
condenser unit



ShelterAir FC as a retrofit for indoor or outdoor installation

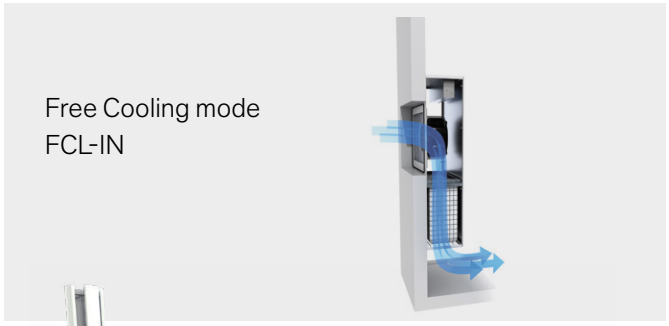
Even today, many shelters and small data centers are still cooled by comfort air conditioning units. They therefore do not gain the advantages of Free Cooling, and unnecessarily large amounts of energy are used for air conditioning. To drastically cut the energy costs of base stations, they can be retrofitted with the STULZ ShelterAir FC Free Cooling unit.

Both the ShelterAir FC and existing comfort units are monitored and controlled by the C102 microprocessor control. Whenever the outside temperature allows, Free Cooling mode is activated and the comfort air conditioning units are switched off. ShelterAir FC enables you to transform your existing system into an energy efficient solution at low cost. The return on investment is achieved especially quickly in applications where comfort air conditioning units are running 24 hours a day. The units are available in two versions for maximum versatility – FCL-IN for indoor installation and FCL for outdoor installation.

Up to 96 % savings on energy costs thanks to Free Cooling mode

Installing the FCL-IN

The FCL-IN is installed indoors, for when maximum protection against vandalism and adverse weather conditions is your priority.

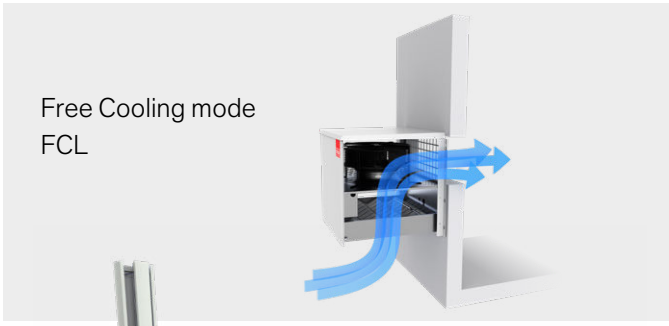


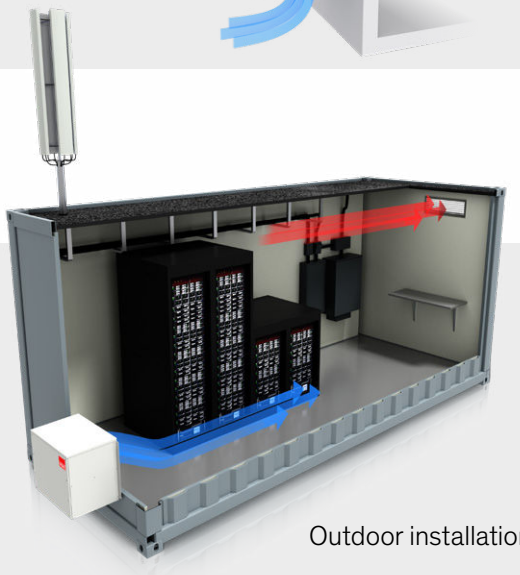


Indoor installation

Installing the FCL

The FCL is installed outside the container, so that the whole of the interior can be used for IT equipment. Full access from the outside for maintenance purposes.





Outdoor installation

ADVANTAGES

- Simple integration of existing comfort air conditioning units
- Set the outside temperature figure for Free Cooling just as you wish
- The entire system including comfort air conditioning units is controlled by the C102 microprocessor control
- Remote monitoring
- Full service accessibility from the front
- Air filter class ISO 16890 ePM_{10} 50 %:
  The larger filter area reduces pressure drops and extends maintenance intervals.
- Insulated, powder-coated housing of galvanized sheet steel
- The filter alarm can be triggered either by differential pressure or based on a manually adjustable fan operating time

OPTIONS

- Aluminum or stainless steel housing
- Humidity sensor
- Weatherproof pressure relief damper
- User-friendly LCD operator terminal for operation, installation and service
- External operator terminal with 3 × 7-segment display
- Protective grill for fitting to the air intake
- Support frame for secure mounting on thin walls
- Supply air grill with adjustable fins
- Metal prefilter
- WIB 1000 interface

AT A GLANCE

- ✔ Free Cooling
- × Mixed mode
- × Displacement
- × Upflow
- × Downflow

Plug & play

FCL
Version for outdoor installation



FCL-IN
Version for indoor installation



Technical data

WallAir

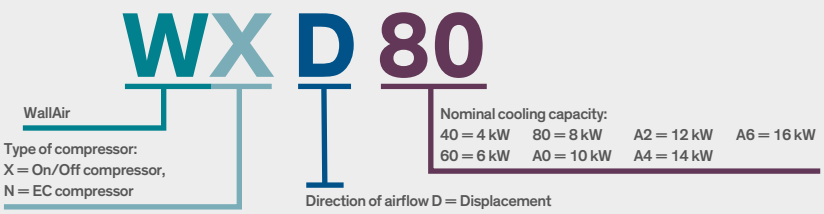
Model		WXD40	WXD60	WXD80	WXDA0	WXDA2	WXDA4	WXDA6	WND80	WNDA4	WNDA6
Cooling capacity [1]	kW	4.6	6.1	8.0	10.0	11.8	13.6	15.5	7.7	13.2	16
Size		**1**	**1**	**1**	**2**	**2**	**2**	**2**	**1**	**2**	**2**

1) Operating conditions: Inside temperature 30 °C, relative humidity 30 %, outside temperature 35 °C

Dimensions

Size		1	2
Width	mm	879	992
Height	mm	2,137	2,192
Depth	mm	565	730

Nomenclature



TelAir

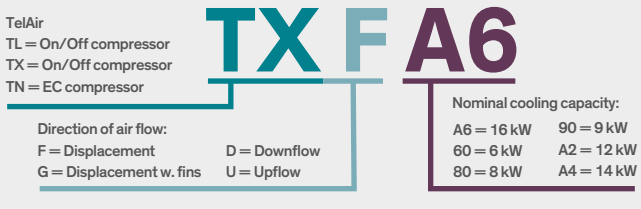
Downflow, Displacement		TLF/TLD40 [2]	TLF/TLD60 [2]	TLF/TLD80 [2]	TLF/TLD90 [2]	TLF/TLDA2 [2]	TLF/TLDA4 [2]	TNF/TND/ TNGA6 [3]	TXF/TXD/ TXGA6 [3]
Cooling capacity [1]	kW	4.8	5.7	8.2	9.0	10.8	12.4	15	16.1
Upflow		**TLU40**	**TLU60**	**TLU80**	**TLU90**	**TLUA2**	**TLUA4**	**TNUA6**	**TXUA6**
Cooling capacity [1]	kW	4.6	5.4	7.8	8.6	10.5	11.5	15	16.1
Size		**1**	**1**	**2**	**2**	**2**	**2**	**3**	**3**

1) Operating conditions: Inside temperature 30 °C, relative humidity 30 %, outside temperature 35 °C
2) TelAir 2
3) TelAir 3

Dimensions

Size		1	2	3
Width	mm	600	900	900
Height	mm	1,990	1.990	2,050
Depth	mm	650	700	750

Nomenclature



SplitAir

Model		SAL40	SAL60	SAL80	SALA0	SALA2	SALA5	SIL80	SILA5
Cooling capacity [1]	kW	5.4	6.7	8.4	11.4	13.5	15.7	8.1	13.0
Size		**1**	**1**	**1**	**2**	**2**	**2**	**1**	**2**

1) Operating conditions: Inside temperature 30 °C, relative humidity 30 %, outside temperature 35 °C

Dimensions

Size		1	2
Width of indoor unit [1]	mm	850	1,040
Height of indoor unit [1]	mm	350	410
Depth of indoor unit [1]	mm	1,160	1,370
Width of outdoor unit	mm	1,050	
Height of outdoor unit	mm	695	1,334
Depth of outdoor unit	mm	492	491

1) With Free Cooling module

Nomenclature

SAL 80

SplitAir
SAL = On/Off compressor
SIL = EC compressor

Nominal cooling capacity:
A6 = 4 kW
60 = 6 kW
80 = 8 kW
A0 = 10 kW
A2 = 12 kW
A5 = 15 kW

ShelterAir FC

Model		FCL 35	FCL-IN 35	FCL 60	FCL-IN 60	FCL-IN 70
Cooling capacity [1]	kW	3.5		6.0		15.0
Size		**2**	**1**	**2**	**1**	**3**

1) Operating conditions: Inside temperature 30 °C, outside temperature 20 °C

Dimensions

Size		1	2	3
Width	mm	640	720	600
Height	mm	1,271	612	1,250
Depth	mm	289	604	600

Nomenclature

FCL 60

ShelterAir FC

FCL = outdoor installation
FCL-IN = indoor installation

Nominal cooling capacity:
35 = 3.5 kW
60 = 6.0 kW
70 = 15.0 kW

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